Boot Camp for ATBC, Kuching, outline schedule

as at 15 March 2018

Note

This is an outline only. We will not try to "cover all the material", as we believe it is more important for participants to have a good grasp of the basic concepts than to be exposed to a lot of material superficially.

Proposed work flow

Items in **bold** are physical activities.

Time slot	What we do	Comments
Before the workshop begins	Before the Boot Camp participants are asked to: 1. Download and install the necessary software and R packages, and Solver if using Excel. 2. Download and preview the workshop materials. 3. Send in one PPT slide to introduce themselves; these are compiled and used for the "Introductions" session. 4. Complete the pre-course knowledge survey.	
Tues 19 June 2018 Day 1 Preliminaries, wildlife data and sampling error, R statistical software	1. Registration, collect name tags, hand in knowledge surveys, etc. 2. Why wildlife data are different (PPT) 3. Introductions (PPT / round-the-room / throw socks) 4. Housekeeping, times 5. **Cross the line** activity 6. **Frogs in ponds 1** : binary data and binomial distribution 7. **Orangutan 1** : count data and Poisson distribution 8. oRientation : R basics 9. Quiz	
Wed 20 June Day 2 Bayesian methods for binary data and for count data	1. Review previous day + quiz, today's quiz sneak peek 2. Rain and clouds (PPT) 3. Rare disease : **Hep S activity** 4. Hep S 2: Comb method **+ Bayes visit** 5. Bayes biopic and Bayes Rule (PPT) 6. Orangutan 2 : Bayesian analysis of count data, comb method in spreadsheet then in R. 7. **Ages** : median, mean, sum-of-squares, MAD, variance, SD 8. (if time: **Squirrels 1** : mean, degrees of freedom, variance, SD.) 9. Quiz	
Thurs 21 June Day 3 Bayesian analysis with MCMC	1. Sketch: Bayes balls 2. Review previous day + quiz; today's quiz sneak peek 3. Distributions; **spinner activity** 4. (if time: **Dice activity** for "Why is Gaussian normal?") 5. **Squirrels** 2 :	

	• Draw sample of squirrels (if not done in Squirrels 1) • Estimate mean (sample mean is good estimator). • Bayesian analysis, estimation of population mean and SD, credible intervals with `wiqid`. • Using samples to define a distribution. • (if time: look at MCMC process; Kruschke's politician.) • Compare strong vs weak priors. 6. Exercise: estimate mean size for two groups of crabs; look at probability that those inside no-fishing zone are bigger. 7. Frogs in ponds 2: Bayesian analysis and CrI. 8. Quiz	
Fri 22 June	Rest day	
Sat 23 June Day 4 Likelihood and AIC, regression	1. Review previous day + quiz; today's quiz sneak peek 2. Probability meanings: **Fisher vs Bayes**; non-Bayesian methods using only likelihood. 3. Frogs 3 : analysis with likelihood only 4. **Frogs 4** : modelling + **Akaike visit** 5. Akaike biopic 6. **Which bag** : AIC 7. Belugas : Simple regression 8. **Socks in Box** (logistic regression) + spreadsheet + R 9. Quiz	
Sun 24 June Day 5 Study Design : the research question, sampling strategies	1. Review previous day + quiz; today's quiz sneak peek 2. More on AIC 3. Belugas 2: Decision making and loss functions 4. **Marmosets** : 2 questions, 1 design 5. **Participants' research questions (RQs)** : put up on sticky sheet 6. Design Schema 1 : 2 types of study, look at RQs 7. Discuss causation and experiments 8. Quasi-experiments and BACI (PPT), any RQs suitable for this? 9. **Pseudo-replication** 10. Design Schema 2 : observational studies 11. Quiz	
Mon 25 June Day 6 Study Design : simulations, data recording and management	1. Review previous day + quiz; today's quiz sneak peek 2. Sampling (PPT) **2.** Design Schema 3 : choice of sampling strategy **3. Sampling shells** 4. Design Schema 4 : Measurement, Putting it together 5. Simulations in R: squirrel sample size, *Rafflesia* and stratified sampling. 6. Quiz	

Tues 26 June	Rest day	
Wed 27 June Day 7 Occupancy	1. Review previous day + quiz; today's quiz sneak peek 2. **Ants** or **Where's Waldo?** : Analysis in R, then back to spreadsheet to explain need for >1 survey. 3. American toads in R, with covariates and time trend: Bayesian and MLE versions 4. Meaning of occupancy: **frogs-in-ponds, herons-at-ponds, porcupine activity**. 5. (if time) Multi-season design or Royle-Nichols or two-species in R, depending on participants' interests/needs. 6. Design of occupancy studies (PPT) 7. Overview of extensions of occupancy (the multis) (PPT) 8. Quiz	
Thurs 28 June Day 8 Density from mark-recapture data	1. Review previous day + quiz; today's quiz sneak peek 2. Intro to SECR (PPT) 3. **Geckos activity,** analysis with 'secr' package in R; MCMC version in `wiqid` 4. Stoats as main example (`secr` in R). 5. (if time) SECR with individual or site covariates 6. Study design for SECR: detector types, scattered clusters of traps (PPT) 7. Quiz	
Fri 29 June Day 9 Survival : Cormack-Jolly-Seber (CJS) model	1. Review previous day + quiz; today's quiz sneak peek 2. Data management (PPT) 3. **Dates in spreadsheets** 4. **Road kills exercise** 5. **Rats experiment** for CJS survival, analysis in R (ML & Bayes) 6. Dipper CJS survival (ML & Bayes) in R 7. Design issues for survival estimation 8. Plans for next day 9. Quiz	
Sat 30 June Day 10 à la carte	1. Review previous day + quiz 2. Whatever folks requested… (options are: review and further examples of topics covered already; relevant topics not covered already; presentation and discussion of participants' research questions). 3. Post-course knowledge survey and participants' feedback 4. Importance of follow up for short courses; postcards. 5. Presentation of certificates 6. Wrap-up	